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ranging from about 80-100 degrees from the polar orientation described above towards an (h k l) plane wherein  $l=0$ , and at least one of h and k is non-zero) or semi-polar GaN substrates (i.e., substrate material where the largest area surface is oriented at an angle ranging from about +0.1 to 80 degrees or 110-179.9 degrees from the polar orientation described above towards an (h k l) plane wherein  $l=0$ , and at least one of h and k is non-zero). Of course, there can be other variations, modifications, and alternatives

While the above is a full description of the specific embodiments, various modifications, alternative constructions and equivalents may be used. Therefore, the above description and illustrations should not be taken as limiting the scope of the present invention which is defined by the appended claims.

What is claimed is:

1. A method of fabricating crystalline material comprising: providing a crystalline substrate having a first surface and a second opposite surface; forming a first layer of crystalline material containing at least a Group III element and N having a first thickness overlying the first surface of the substrate; and forming a second layer of crystalline material overlying the second surface of the substrate, the second crystalline material having substantially the same first thickness and having substantially the same composition as the first layer of crystalline material, such that the first crystalline material and second crystalline material are substantially free from bow; wherein the first layer is formed by a process selected from MOCVD, HVPE, LPE, and MBE; and the second layer is formed by a process selected from MOCVD, HVPE, LPE, and MBE.
2. The method of claim 1 wherein the structure substantially free from bow is then used as a seed for growth.
3. The method of claim 1 wherein the first layer of crystalline material and the second layer of crystalline material are formed at the same time.
4. The method of claim 1 wherein the crystalline substrate comprises two separate crystalline wafers that have been bonded or fused together.
5. An epitaxial layer grown on crystalline material wherein the crystalline material is fabricated by a method comprising: providing a crystalline substrate having a first surface and a second opposite surface; forming a first layer of crystalline material containing at least a Group III element and N having a first thickness overlying the first surface of the substrate; and forming a second layer of crystalline material overlying the second surface of the substrate, the second crystalline material having substantially the same first thickness and having substantially the same composition as the first layer of crystalline material, such that the first crystalline material and second crystalline material are substantially free from bow.
6. The method of claim 1 wherein the first layer of crystalline material or the second layer of crystalline material has an orientation within 10 degrees of (10-10) or (11-20), along with their associated family of planes.
7. The method of claim 1 wherein the first layer of crystalline material or the second layer of crystalline material has a semipolar orientation.
8. The method of claim 7 wherein a semipolar orientation refers to a plane with an orientation within 5 degrees of (10-11), (10-1-1), (10-12), (10-1-2), (10-13), (10-1-3), (11-21), (11-2-1), (20-21), (20-2-1), (10-14), (10-1-4), (11-22), or (11-2-2), along with their associated families of planes.

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9. The method of claim 1 wherein the first layer and the second layer are within 500 microns of each other in thickness.

10. The method of claim 1 further comprising at least one overlying layer covering the first layer deposited on the first layer prior to forming the second layer.

11. A method of fabricating crystalline material comprising:

providing a first crystalline substrate material having a first surface and a second surface;

forming a first thickness of first crystalline material overlying the first surface of the first crystalline substrate material, the first thickness of first crystalline material having a first orientation;

providing a second crystalline substrate material having a first surface and a second surface;

forming a second thickness of second crystalline material overlying the first surface of the second crystalline substrate material, the second thickness of second crystalline material having a second orientation; and

attaching the first crystalline substrate and the second crystalline substrate to form a composite substrate such that the composite substrate is configured to be substantially free from bow.

12. The method of claim 11 wherein the step of attaching is performed by a process selected from wafer fusion, wafer bonding, semiconductor wafer bonding, solder bonding, thermocompression bonding, eutectic bonding, and diffusion bonding.

13. The method of claim 11 wherein at least one material is disposed between the first crystalline substrate and the second crystalline substrate.

14. The method of claim 11 wherein the attaching uses at least one material disposed between the first crystalline substrate and the second crystalline substrate.

15. A method of fabricating crystalline material containing at least a Group III element and N comprising:

providing a crystalline substrate having a first surface and a second opposite surface;

forming a first layer of crystalline material having a first thickness overlying the first surface of the crystalline substrate; and

forming a second layer of crystalline material overlying the second surface of the crystalline substrate, the second layer of crystalline material having substantially the same first thickness and having substantially the same composition as the first layer of crystalline material overlying the first surface of the crystalline substrate, such that the crystalline substrate together with the first layer of crystalline material and the second layer of crystalline material creates a structure that is substantially free from bow.

16. The method of claim 15 wherein the first layer of crystalline material and the second layer of crystalline material are formed at the same time.

17. A method for fabricating crystalline material comprising:

providing a first crystalline substrate material having a first surface and a second surface;

forming a first thickness of first crystalline material overlying the first surface of the first crystalline substrate material, the first thickness of first crystalline material having a first orientation;

providing a second crystalline substrate material having a first surface and a second surface;

forming a second thickness of second crystalline material overlying the first surface of the second crystalline sub-